

Wisconsin's 1998 Lake Michigan Charter Report

INTRODUCTION

The charter boat industry in Wisconsin grew steadily from 188 licenses in 1976 to 524 licenses in 1985 and 1988. Since 1989, the charter boat fleet has steadily declined to 238 in 1998. However, during this time period, the number of trips, anglers and harvested salmonids have remained stable, making the charter industry a significant contributor to the sport fishing on Lake Michigan.

Data from the Charter Fishing industry have been instrumental in several **key** management decisions the Wisconsin Department of Natural Resources has implemented in the last 14 years in Lake Michigan: 1) salmonid stocking was reduced by 10% in 1986 to reduce predation mortality on alewives; 2) chinook salmon stocking was reduced by 25% in 1991 to reduce predation mortality on alewives; 3) coho salmon daily bag limit was reduced from 5 to 3 in 1995 to increase the number of adult fish returning to brood stock collection facilities in fall and 4) chinook salmon stocking was reduced by 15% in 1999 to once again reduce the predation mortality on alewives.

The objective of the charter boat reporting survey is to obtain information on not only the number, type and location of salmonids caught on Lake Michigan and Green Bay but also demographics on the people who fish on those charters. The information collected will 1) help Wisconsin Department of Natural Resources Fish Management determine stocking levels; 2) provide fish managers with important trend information concerning the status of stocked

salmonids in Lake Michigan; and 3) provide important data on the type of people fishing and location of the fishing trips.

METHODS

General

At the beginning of each fishing season, a packet of information was sent to each licensee. This packet included notes on important fishing items, a sample of a completed monthly report, grid map of Lake Michigan, list of wardens, coded-wire tag collection stations, finclip list, sea lamprey information and a supply of monthly report forms.

Each license holder was required by law to report all paid charters. The report was to be mailed by the 10th of each month on the records for the preceding calendar month to the Plymouth Field Station of the WDNR. If a report was late or incorrectly filled out a warning letter was sent. Only one letter was sent per license holder and any subsequent violations were referred directly to a Wisconsin Conservation Warden.

The information obtained from each form included: license number, fishing port, date of fishing trip, grid fished, number of resident and nonresident anglers, number of fished harvested, time each trip started (am, pm, evening), number of lines fished and number of hours fished. This information had to be recorded within half an hour after completing each trip after returning to the dock or shore. The number of lake trout, coho salmon, brown trout, steelhead, chinook salmon and other species caught, tag numbers present and the number of lampreys attached to chinook salmon and lake trout had to be recorded prior to midnight of the day of each trip. The data were

received at the Plymouth Field Station, entered and checked for errors.

New tables to track trend information data for the charter boat fleet were started in 1998. Tables 13 - 32 show data by port location that was indicated on each licensee's monthly report form. Since this is the first year of the tables, no prior trend information is available.

Charter report survey

During the 1998 season, creel clerks or field personnel during routine field activities would conduct a check of charter boat activity. Information obtained included date, fishing port, captain's name, boat name, triptime and number and type of fish caught. In addition, whether this trip was a paid charter or not was recorded. Only those records that indicate the trip was a **PAID** charter were used in the analysis. This survey should help Fish Management determine the percentage of unreported charter trips and accuracy of the charter reports.

RESULTS and DISCUSSION

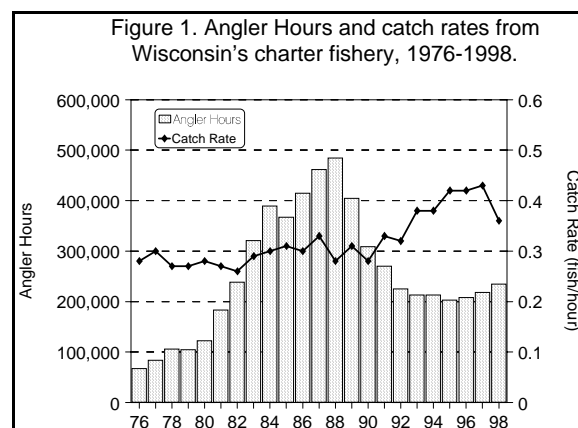
Charter report survey

During the 1998 season, 68 charter boats were recorded by field personnel to be on a paid charter trip. Information from each trip was loaded into a file and cross checked with reported trips from charter captains. A total of 64 trips or 94% of possible charter trips recorded by field personnel were reported by captains, with 4 (6%) unaccounted trips. Of the 64 confirmed reported trips, only 49 trips (77%) matched data received by charter captains on their monthly report form.

Over the past several years, the unaccounted trip percentage has been about 25% annually. In 1998, Fish Management observed that only 6% of possible charter trips were not recorded, much lower than previous years and indicate that checks conducted by field personnel may be reducing the number of non-reported trips. For the confirmed trips, there was a 22% error rate on the number of fish caught. These observations may indicate a possible problem with inaccurate reporting on validated trips. Further surveys and Law Enforcement checks may need to be done in 1999 to check the validity of these observations.

Compliance

During 1998, 61 or 26% of all charter captains did not send their reports in on



time. In addition, an average of 19 or 8% of all monthly charter reports were not sent in on time. The average compliance time for the late monthly reports was about one month with the final compliance rate for 1998 of 99%.

Effort

The number of charter licenses for the 1998 charter season was 238, which was

the lowest since 1981 (Table 1), but the decline from the previous year was only 7 licenses, the lowest decline in 10 years. The number of angler hours increased by 7% from 1997, the third increase in as many years (Figure 1). In addition, boat hours increased by about 6% and line hours increased by 1% (Table 1). The number of total anglers increased from 45,537 in 1997 to 49,029 in 1998 with the increase present in the resident angler category.

Change in angler effort, unlike previous years in which it was most noticeable at northern or southern ports, varied from port to port. Washington Island-Sturgeon Bay angler hours increased by 7% from 1997, the first increase in effort in 11 years (Table 6). Algoma-Kewaunee angler hours increased by 7% from 1997, the third straight year of increased fishing effort (Table 7). Two Rivers-Manitowoc angler hours increased by 22% while Sheboygan angler hours increased by only 6%, its highest effort in 6 years (Table 8 & 9). Both Port Washington-Milwaukee and Racine-Kenosha angler hours increased in 1998 by 8% and 4%, respectively (Table 10 & 11). The Two Rivers-Manitowoc area had the largest increase over last year increasing by 22% (Table 8).

Catch rate

The catch rate (number of fish caught per hour) was 0.36 in 1998 (Table 2 & Figure 1). Despite a decrease in the number of captains the catch rate over the years has remained fairly constant. The catch rate for 1998 was lower than previous years but still higher than the average catch rate. This can be attributed to the decrease in the coho salmon harvest in the south. Coho salmon catch rates declined dramatically in 1998, falling to

0.05 fish/hour (Table 4). Coupled with this decline was an increase in the lake trout catch rate to 0.10 fish/hour. The last time the coho salmon harvest and catch rates were low occurred in 1991 when only 11,686 were harvested (Table 3). In that year the lake trout catch rate was also 0.10 fish/hour. There appears to be a switch from coho salmon to lake trout in southern ports when coho salmon are not readily caught.

Chinook salmon catch rates were the highest of any species at 0.13 fish/hour, holding the top spot for the 13th time out of 23 years of the charter survey. Both steelhead and brown trout catch rates were average (0.08 and 0.01 fish/hour respectively).

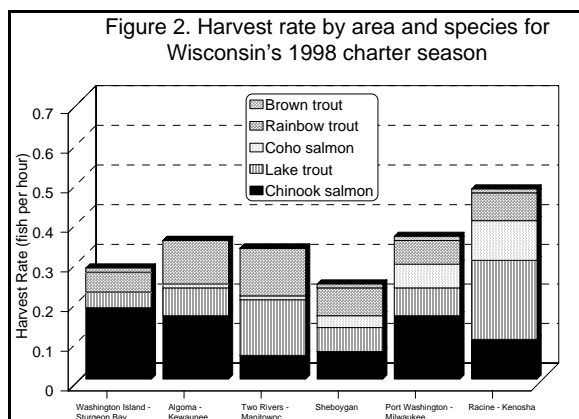
This parameter provides one of the best measures to evaluate the charter industry and indicates that charter fishing on Lake Michigan remains very successful.

Harvest

Chinook salmon returned as the number one harvested fish in 1998, dominating the catch at 35% with 29,935 fish. The lake trout harvest was second at 29% (24,285) (Table 3), exhibiting a big increase from 1997 (+6,982 fish). This again indicates a switch from coho salmon, when they are not present, to lake trout. A trend that has persisted in the charter fishing industry since 1991. Coho salmon harvest dropped to 10,593 or 12% of the harvest exhibiting one of the largest drops recorded from a previous year of 22,079 fish. The brown trout harvest decreased from 2,733 fish in 1997 to 1,683 fish in 1998, representing just 2% of the harvest. Steelhead harvest increased by 3,586 fish from 1997 to 18,352 fish, which comprised 22% of the catch.

Chinook salmon catch rates (fish per angler hour) remained fairly constant for the year as well as from area to area compared to previous years. The overall catch rate was 0.13 fish/hour, up slightly from 1997 (Table 4) Washington Island-Sturgeon Bay anglers had the best catch rate (0.18 chinook/hour). Algoma-Kewaunee and Port Washington angler catch rates were also quite high at 0.16 chinook/hour. The other ports had average catch rates for chinook salmon (0.07-0.10 chinook/hour)(Figure 2).

Coho salmon catch rates for the year were very low at 0.05 fish/hour, the lowest since 1991 (Table 4). Coho salmon catch rates were highest in the Racine-Kenosha area at 0.10 coho/hour but substantially lower than previous years. Port Washington-Milwaukee anglers had substantially lower catch rates at 0.06 coho/hour. Due to coho migration patterns, anglers in other ports



had very low coho catch rates (i.e. below 0.03 coho/hour)(Figure 2).

Steelhead catch rates were high to average in all areas in 1998. Overall catch rates were 0.08 steelhead/hour, which was slightly higher than 1997 (Table 4). Manitowoc-Two Rivers anglers had the highest catch rate at 0.12 steelhead/hour while the Algoma-

Kewaunee fishermen were close behind at 0.11 steelhead/hour. All other ports had similar catch rates (0.05-0.07 steelhead/hour)(Figure 2).

Lake trout catch rates increased from 1997 to 0.10 lake trout/hour (Table 4). Kenosha-Racine anglers had the highest catch rates for lake trout at 0.20 lakers/hour followed by Two Rivers-Manitowoc at 0.14 lakers/hour. The other ports had average catch rates (0.03-0.07 lakers/hour)(Figure 2).

Brown trout catch rates were 0.01 or 0.00 in every port. The catch rates for brown trout are the lowest among the species and is reflected in their low harvest numbers in almost every year.

The monthly breakdown shown in Tables 5 & 12 illustrates the monthly totals for angler hours, harvest and catch rates. In May, the catch rate was higher than average at 0.48 fish/hour. The higher catch rates can be attributed to the 3,199 coho salmon and 1,578 lake trout caught during this month (Tables 5 & 12). The catch rate declined but was still high at 0.43 in June based on the strong steelhead (5,079), lake trout (5,735) and chinook salmon (5,519) harvest. The July catch rate decreased to 0.31 fish/hour with a steelhead, chinook salmon and lake trout harvest of 3,076, 10,886 and 7,731. The August catch rate of 0.36 fish/hour was the second highest its been in 13 years due to high numbers of steelhead and lake trout caught. The September and October catch rates of 0.32 and 0.24 fish/hour were also fairly high with large amounts of chinook salmon, lake trout and steelhead taken in these months.

The homeport analysis (Tables 13-32) shows the breakdown of angler hours,

catch rate and catch for the majority of ports captains listed on the Sport Trolling License Monthly Report Form 9400-249 rev 12-93. Unlike previous years when homeport listed on their applications were used in these tables, ports listed on the monthly reports were used. Anglers from six ports, including Algoma, Kenosha, Port Washington, Racine, Sheboygan and Winthrop Harbor harvested 61,065 fish or 72% of all salmonids (Figure 4). Anglers from five other ports, Kewaunee, Manitowoc, Milwaukee, Sturgeon Bay and Two Rivers harvested 19,224 fish or 23% of all salmonids. These ports comprised 95% of the harvested salmonids. Several ports had high catch rates. Racine catch rates were 0.52 fish/hour followed by Kenosha at 0.47 fish/hour, Winthrop Harbor at 0.44 fish/hour and Port Washington at 0.38 fish/hour. Both the harvest and higher catch rates were concentrated in the southern end of Lake Michigan due to the excellent chinook and lake trout harvest exhibited in 1998.

Sea lamprey incidence rates (lamprey per 100 fish) for Wisconsin water's of Lake Michigan (Table 33) for chinook salmon and lake trout were 0.16 and 0.57, respectively. These rates were much higher than previous years with many charter captains observing more lampreys than other years. The majority of the attached lampreys occurred in the southern ports from Racine to Winthrop Harbor. Sea lamprey incidence rates have quadrupled for chinook salmon and tripled for lake trout since 1996, indicated a possible source of sea lamprey spawning in the southern part of Lake Michigan.

SUMMARY

The 1998 charter fishing season was

very successful and will be remembered as the year for chinook salmon, lake trout and steelhead. Anglers in 1998 caught a large number of chinook salmon (29,935) and lake trout (24,285).

The trend that first appeared in 1991 when anglers turned from the hard to catch coho salmon that year to lake trout occurred again in 1998. Coho salmon harvest and catch rates were very low in 1998 forcing captains to target other species. This caused a large harvest of lake trout (24,285) with very good catch rates in some ports. The problem with catching coho salmon in the south also caused those captains to target steelhead more aggressively especially from Port Washington to Winthrop Harbor.

TABLE 1
Wisconsin's Lake Michigan
Charter Fishery Effort: 1976-1998

Year	Number of charter licenses	NUMBER OF ANGLERS			EFFORT HOURS		
		Resident	Nonresident	Total	Angler hours	Line hours	Boat hours
1976	188	9,801	3,354	13,155	67,578	88,036	16,406
1977	200	11,478	4,910	16,388	83,820	113,510	19,403
1978	159	13,300	6,203	19,503	105,667	136,861	21,869
1979	144	13,483	7,099	20,582	104,649	144,866	22,528
1980	154	13,821	9,260	23,081	122,463	169,908	24,827
1981	172	16,731	15,421	32,152	183,525	249,821	34,822
1982	264	18,966	25,548	44,514	238,639	338,812	48,921
1983	364	21,770	38,577	60,347	320,724	472,184	67,407
1984	477	21,936	47,683	69,619	389,252	630,899	83,433
1985	524	21,536	46,764	68,300	367,182	620,720	80,063
1986	510	23,250	53,921	77,171	414,820	784,931	90,153
1987	497	24,776	61,613	86,389	461,351	889,752	99,608
1988	524	28,273	64,484	92,757	484,685	1,013,855	105,860
1989	501	24,648	53,772	78,420	404,432	883,946	89,381
1990	437	22,467	37,144	59,611	308,755	685,462	68,102
1991	388	20,867	32,789	53,656	270,414	602,725	60,014
1992	340	19,425	27,704	47,129	225,254	544,689	50,619
1993	295	19,797	24,356	44,153	213,198	539,429	47,930
1994	284	19,732	24,356	44,088	213,113	552,428	47,425
1995	264	20,019	22,443	42,462	203,019	505,786	44,449
1996	257	20,180	22,787	42,967	207,895	525,388	45,260
1997	243	22,656	22,881	45,537	218,044	504,659	44,238
1998	238	25,989	23,040	49,029	234,814	510,073	46,968

TABLE 2
Wisconsin's Lake Michigan
Charter Fishery Catch Rate: 1976-1998

Year	Fish/Angler Hour	Angler Hours/Fish
1976	0.28	3.52
1977	0.30	3.34
1978	0.27	3.63
1979	0.27	3.68
1980	0.28	3.55
1981	0.27	3.71
1982	0.26	3.78
1983	0.29	3.44
1984	0.30	3.31
1985	0.31	3.24
1986	0.30	3.34
1987	0.33	3.07
1988	0.28	3.62
1989	0.31	3.21
1990	0.28	3.60
1991	0.33	3.06
1992	0.32	3.17
1993	0.38	2.62
1994	0.38	2.60
1995	0.42	2.39
1996	0.42	2.41
1997	0.43	2.31
1998	0.36	2.76

TABLE 3
Wisconsin's Lake Michigan Charter Fishery Catch: 1976-1998
(Percent of Total Catch in Parentheses)

Year	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total Catch
1976	418 (2%)	1,261 (7%)	2,982 (15%)	11,449 (60%)	3,066 (16%)	19,223
1977	399 (2%)	1,986 (8%)	7,564 (30%)	9,660 (38%)	5,456 (22%)	25,117
1978	791 (3%)	2,508 (9%)	4,921 (16%)	11,873 (41%)	8,998 (31%)	29,136
1979	987 (3%)	1,460 (5%)	3,171 (12%)	13,978 (49%)	8,810 (31%)	28,420
1980	1,559 (5%)	1,149 (3%)	9,251 (26%)	9,900 (29%)	12,631 (37%)	34,526
1981	1,872 (4%)	1,525 (3%)	7,695 (16%)	17,464 (35%)	20,752 (42%)	49,455
1982	1,748 (3%)	873 (1%)	13,263 (21%)	20,997 (33%)	26,193 (41%)	63,150
1983	3,111 (3%)	1,967 (2%)	5,135 (6%)	46,730 (50%)	36,147 (39%)	93,129
1984	4,822 (4%)	3,247 (3%)	25,217 (22%)	34,503 (30%)	49,612 (42%)	117,709
1985	5,801 (5%)	2,790 (2%)	21,058 (19%)	26,475 (23%)	56,919 (50%)	113,293
1986	4,302 (3%)	4,003 (3%)	20,435 (16%)	27,857 (22%)	67,437 (54%)	124,034
1987	5,705 (4%)	15,635 (10%)	19,078 (13%)	32,696 (22%)	76,522 (51%)	149,636
1988	5,823 (4%)	20,491 (15%)	28,936 (22%)	37,463 (28%)	40,805 (31%)	133,518
1989	5,750 (5%)	21,300 (17%)	27,949 (22%)	34,016 (27%)	35,861 (29%)	124,876
1990	4,423 (5%)	12,937 (15%)	18,185 (21%)	26,829 (31%)	23,322 (27%)	85,696
1991	4,759 (5%)	15,378 (17%)	11,686 (13%)	25,893 (29%)	30,750 (35%)	88,466
1992	4,733 (7%)	13,961 (20%)	19,191 (27%)	16,718 (24%)	16,456 (23%)	71,059
1993	5,035 (6%)	24,891 (31%)	17,676 (22%)	17,249 (21%)	16,618 (20%)	81,469
1994	3,378 (4%)	24,641 (30%)	21,268 (26%)	14,212 (17%)	18,392 (23%)	81,891
1995	2,730 (3%)	23,065 (27%)	12,492 (15%)	18,332 (22%)	28,273 (33%)	84,892
1996	2,204 (3%)	12,917 (15%)	27,025 (31%)	9,972 (12%)	34,173 (39%)	86,291
1997	2,733 (3%)	14,766 (16%)	32,672 (34%)	17,303 (18%)	27,046 (29%)	94,520
1998	1,683 (2%)	18,352 (22%)	10,593 (12%)	24,285 (29%)	29,935 (35%)	84,848

TABLE 4
Wisconsin's Lake Michigan Charter Fishery Catch Rate: 1976-1998

Year	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon
1976	0.01	0.02	0.04	0.17	0.05
1977	0.00	0.02	0.09	0.12	0.07
1978	0.01	0.02	0.05	0.11	0.09
1979	0.01	0.01	0.03	0.13	0.08
1980	0.01	0.01	0.08	0.08	0.10
1981	0.01	0.01	0.04	0.10	0.11
1982	0.01	0.00	0.06	0.09	0.11
1983	0.01	0.01	0.02	0.15	0.11
1984	0.01	0.01	0.06	0.09	0.13
1985	0.02	0.01	0.06	0.07	0.16
1986	0.01	0.01	0.05	0.07	0.16
1987	0.01	0.03	0.04	0.07	0.17
1988	0.01	0.04	0.06	0.08	0.08
1989	0.01	0.05	0.07	0.08	0.09
1990	0.01	0.04	0.06	0.09	0.08
1991	0.02	0.06	0.04	0.10	0.11
1992	0.02	0.06	0.09	0.07	0.07
1993	0.02	0.11	0.08	0.07	0.07
1994	0.02	0.12	0.10	0.07	0.09
1995	0.01	0.11	0.06	0.09	0.14
1996	0.01	0.06	0.13	0.05	0.16
1997	0.01	0.07	0.15	0.08	0.12
1998	0.01	0.08	0.05	0.10	0.13

Table 5

Estimated catch per hour, catch, number of lamprey on chinook salmon and lake trout, effort, number of anglers and number of charter trips for Wisconsin's 1998 Lake Michigan charter fishery by month.

Species	Total Catch per hour	Mar/Apr	May	June	July	August	Sept	Oct	Season
Brown Trout	0.0072	24	86	238	558	383	351	43	1,683
Rainbow Trout	0.0782	4	1,325	5,079	3,076	6,063	2,745	60	18,352
Coho Salmon	0.0451	22	3,199	4,452	1,110	989	796	25	10,593
Lake Trout	0.1034	4	1,578	5,735	7,731	7,174	2,010	53	24,285
Chinook Salmon	0.1275	3	463	5,519	10,886	9,481	3,322	261	29,935
TOTAL	0.3614	57	6,651	21,023	23,361	24,090	9,224	442	84,848
Lamprey on Chinook Salmon		0	1	4	24	19	0	0	48
Lamprey on Lake trout		0	11	42	39	31	9	0	132
Angler hours		205	13,877	49,059	74,671	66,274	28,866	1,862	234,814
Anglers									
Resident		16	1,483	5,637	8,025	7,343	3,276	209	25,989
Nonresident		32	1,613	4,632	7,246	6,493	2,815	209	23,040
Charter Trips		13	607	1,977	3,104	2,816	1,257	86	9,860

TABLE 6
Washington Island-Sturgeon Bay Charter Fishery Effort,
Catch Rate, and Catch: 1976-1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1976	17,008	.46	214	128	173	6,211	1,036	7,762
1977	12,367	.44	124	93	123	4,035	1,104	5,479
1978	27,541	.30	384	314	232	4,622	2,631	8,183
1979	21,110	.25	376	79	122	2,520	2,134	5,231
1980	36,801	.20	866	162	380	2,320	3,651	7,379
1981	50,039	.19	1,080	190	123	2,820	5,380	9,593
1982	50,447	.20	796	62	328	3,124	5,706	10,059
1983	60,919	.21	1,466	79	113	3,269	8,083	13,026
1984	66,086	.24	2,479	180	489	2,287	10,632	16,112
1985	75,126	.27	2,174	264	508	3,490	13,780	20,295
1986	83,667	.25	1,331	256	564	2,225	16,514	20,890
1987	93,025	.24	1,529	388	254	1,361	19,236	22,768
1988	91,762	.19	1,195	1,115	169	2,802	12,443	17,724
1989	84,449	.25	2,170	2,765	969	1,996	13,025	20,925
1990	65,502	.22	2,260	1,826	66	1,866	8,204	14,222
1991	57,774	.27	1,447	1,730	66	636	11,774	15,653
1992	36,360	.22	881	1,547	27	677	4,951	8,083
1993	36,181	.27	1,086	2,883	58	541	5,160	9,728
1994	30,919	.34	668	3,085	19	643	6,227	10,642
1995	29,109	.47	519	1,798	48	1,059	10,234	13,658
1996	27,439	.39	246	711	54	1,106	8,493	10,610
1997	26,587	.37	306	1,852	49	830	6,867	9,904
1998	28,537	.28	196	1,559	64	1,065	5,217	8,101

TABLE 7
Algoma-Kewaunee Charter Fishery Effort,
Catch Rate, and Catch: 1976-1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1976	15,216	.28	56	358	185	3,202	491	4,292
1977	9,219	.35	41	533	505	1,721	398	3,198
1978	16,959	.29	37	738	200	3,029	929	4,933
1979	15,561	.33	50	301	146	3,923	737	5,157
1980	18,748	.33	162	378	984	2,950	1,741	6,215
1981	26,163	.29	153	302	283	3,610	3,190	7,538
1982	40,817	.22	206	211	726	2,962	4,971	9,080
1983	53,248	.25	394	839	403	4,219	7,570	13,427
1984	52,881	.29	419	928	1,051	3,246	9,468	15,174
1985	49,767	.32	526	729	482	3,070	10,927	15,752
1986	64,448	.26	333	1,379	349	2,535	11,986	16,582
1987	62,376	.33	441	3,420	378	2,779	13,692	20,710
1988	68,582	.24	393	4,205	375	4,237	6,901	16,111
1989	54,666	.31	361	6,436	1,130	3,719	5,108	16,754
1990	43,643	.27	284	5,274	355	2,384	3,426	11,723
1991	42,443	.33	498	6,094	374	2,088	5,060	14,114
1992	33,674	.30	400	5,255	213	1,071	3,185	10,124
1993	33,989	.41	595	7,748	338	1,374	3,789	13,844
1994	37,038	.40	295	8,019	214	1,382	4,898	14,808
1995	31,300	.47	294	5,496	256	2,490	6,117	14,653
1996	33,992	.40	173	2,892	222	2,306	8,134	13,727
1997	36,959	.39	131	5,408	218	2,542	6,086	14,385
1998	39,717	.36	56	4,555	272	2,953	6,527	14,363

TABLE 8
Two Rivers-Manitowoc Charter Fishery Effort,
Catch Rate, and Catch: 1976-1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1976	6,987	.26	58	78	285	1,337	107	1,865
1977	8,421	.36	15	266	765	1,746	258	3,050
1978	12,370	.24	23	297	325	1,629	765	3,039
1979	14,811	.35	39	263	216	3,993	615	5,126
1980	11,536	.40	86	212	923	2,427	937	4,585
1981	19,912	.36	41	106	245	5,081	1,789	7,262
1982	21,849	.34	25	114	407	4,629	2,242	7,414
1983	29,073	.43	61	158	145	9,222	2,780	12,498
1984	52,421	.29	221	406	2,063	8,189	4,565	15,448
1985	45,700	.30	556	307	1,145	5,957	5,738	13,712
1986	50,583	.28	351	345	738	4,814	7,784	14,032
1987	96,651	.32	1,060	5,903	1,609	9,331	12,547	30,450
1988	100,263	.25	700	6,356	1,435	11,087	5,418	24,996
1989	72,052	.27	527	4,525	1,105	9,193	4,277	19,627
1990	37,264	.25	469	1,321	304	5,138	1,906	9,138
1991	28,599	.32	238	1,811	229	5,553	1,396	9,227
1992	23,434	.26	563	1,402	124	2,949	1,086	6,124
1993	20,470	.34	248	2,001	169	3,326	1,211	6,955
1994	17,597	.30	332	2,227	224	1,508	1,070	5,361
1995	16,010	.37	241	1,724	187	2,615	1,207	5,974
1996	17,370	.34	139	1,370	855	1,064	2,551	5,979
1997	15,425	.34	104	1,538	260	1,671	1,696	5,269
1998	18,957	.34	57	2,325	203	2,674	1,137	6,396

TABLE 9
Sheboygan Charter Fishery Effort,
Catch Rate, and Catch: 1976-1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1976	6,142	.25	32	284	504	273	470	1,563
1977	9,374	.27	41	482	934	358	768	2,583
1978	7,748	.28	154	381	351	424	778	2,088
1979	13,137	.22	124	362	571	601	1,344	2,948
1980	16,381	.31	172	191	2,019	433	2,213	5,028
1981	22,137	.24	225	383	955	903	2,926	5,392
1982	35,860	.24	342	214	1,572	1,628	4,683	8,445
1983	54,136	.31	580	396	1,180	8,650	6,077	16,896
1984	68,200	.32	538	811	6,379	5,999	7,829	21,559
1985	65,851	.31	1,276	961	3,947	4,063	9,964	20,259
1986	68,677	.35	1,040	1,154	5,286	4,893	11,337	23,710
1987	63,243	.38	1,498	2,848	4,285	4,252	10,947	23,830
1988	75,690	.30	1,332	6,166	3,721	6,341	5,221	22,781
1989	60,532	.30	1,055	3,665	2,344	6,409	4,860	18,333
1990	48,129	.27	504	1,999	1,121	6,360	3,000	12,984
1991	41,143	.31	1,075	2,033	938	5,261	3,389	12,696
1992	36,833	.26	1,177	2,300	778	3,353	1,995	9,603
1993	32,125	.30	1,114	2,788	576	3,438	1,698	9,614
1994	30,095	.26	484	2,932	507	2,035	1,808	7,766
1995	27,314	.32	445	2,602	685	2,466	2,580	8,778
1996	27,368	.30	204	1,789	1,525	739	3,895	8,152
1997	31,240	.22	313	1,612	814	2,026	2,263	7,028
1998	33,023	.23	245	2,405	844	1,882	2,187	7,563

TABLE 10
Port Washington-Milwaukee Charter Fishery Effort,
Catch Rate, and Catch: 1976-1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1976	16,315	.16	50	310	1,165	341	828	2,694
1977	22,316	.23	108	251	2,419	386	1,874	5,038
1978	14,764	.19	74	141	723	190	1,699	2,827
1979	24,871	.22	206	214	1,255	750	2,935	5,360
1980	24,245	.28	221	139	3,086	325	3,120	6,891
1981	33,912	.26	275	307	2,639	976	4,604	8,801
1982	51,003	.24	300	155	4,152	1,500	6,303	12,413
1983	62,181	.22	388	236	1,650	3,379	7,798	13,451
1984	74,265	.24	470	298	5,121	1,223	10,624	17,841
1985	84,489	.25	956	238	6,882	834	12,569	21,495
1986	88,424	.27	849	309	7,736	1,428	13,662	23,984
1987	92,629	.29	919	1,816	8,126	1,870	14,060	26,791
1988	95,298	.29	1,900	1,814	13,701	1,360	8,998	27,773
1989	82,424	.29	1,183	2,560	11,046	2,747	6,100	23,636
1990	69,510	.23	691	1,901	5,181	3,026	4,954	15,753
1991	56,995	.28	832	2,095	4,358	2,802	5,818	15,905
1992	49,710	.27	1,125	2,423	4,604	1,853	3,237	13,242
1993	47,411	.38	1,049	6,701	4,961	1,776	3,422	17,909
1994	49,067	.34	810	5,640	4,999	1,669	3,415	16,533
1995	53,449	.40	657	8,058	4,478	2,608	5,566	21,367
1996	48,910	.37	517	3,269	7,475	779	6,120	18,160
1997	51,723	.42	812	2,555	10,051	2,774	5,525	21,717
1998	56,168	.36	604	3,496	3,091	3,869	9,260	20,320

TABLE 11
Racine-Kenosha Charter Fishery Effort,
Catch Rate, and Catch: 1976-1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1976	5,930	.17	8	103	670	72	134	987
1977	9,462	.26	13	115	1,781	93	421	2,423
1978	12,051	.26	54	206	1,694	342	886	3,182
1979	10,118	.20	24	107	831	392	683	2,037
1980	14,108	.29	51	61	1,816	1,323	832	4,083
1981	14,907	.32	19	123	1,836	1,626	1,243	4,847
1982	38,663	.41	79	117	6,078	7,154	2,288	15,736
1983	61,167	.39	197	259	1,538	17,991	3,839	23,831
1984	61,867	.44	414	441	9,189	12,533	4,335	26,917
1985	46,249	.47	313	291	8,094	9,061	3,941	21,780
1986	59,207	.42	398	560	5,762	11,962	6,154	24,836
1987	53,427	.47	258	1,260	4,426	13,103	6,040	25,087
1988	53,090	.46	303	835	9,535	11,636	1,824	24,133
1989	50,349	.51	454	1,349	11,355	9,952	2,491	25,601
1990	44,707	.49	215	616	11,158	8,055	1,832	21,876
1991	43,460	.48	669	1,615	5,721	9,553	3,313	20,871
1992	45,243	.53	587	1,034	13,445	6,815	2,002	23,883
1993	43,022	.54	943	2,770	11,574	6,794	1,338	23,419
1994	48,397	.55	789	2,738	15,305	6,975	974	26,781
1995	45,837	.45	574	3,387	6,838	7,094	2,569	20,462
1996	52,816	.56	925	2,886	16,894	3,978	4,980	29,663
1997	56,110	.65	1,067	1,801	21,280	7,460	4,609	36,217
1998	58,412	.48	525	4,012	6,119	11,842	5,607	28,105

Figure 3. Harvest of salmonids by area (i.e. grid location) for Wisconsin's 1998 charter season

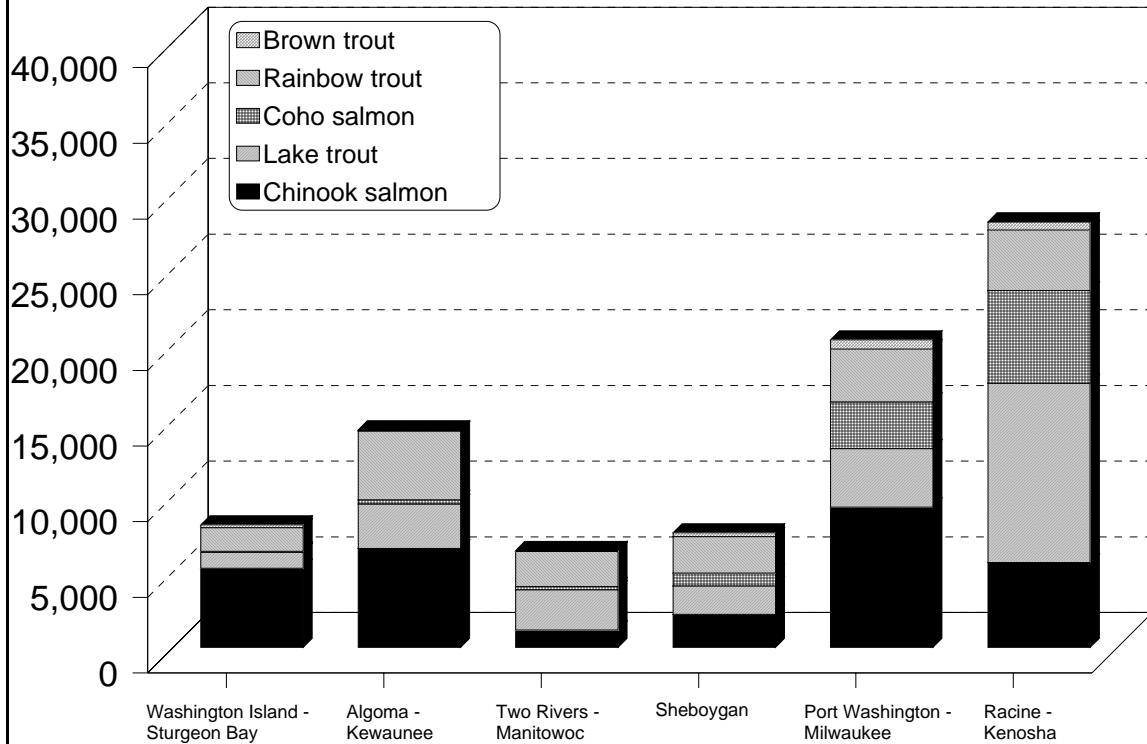


Table 12
Monthly Charter Fishery Effort, Catch and Catch Rate: 1985-1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
Apr-85	1,980	0.52	278	4	532	86	117	1,031
-86	1,690	0.23	127	2	45	37	174	385
-87	3,133	0.17	269	2	143	0	119	533
-88	2,512	0.15	95	0	181	1	105	383
-89	2,509	0.25	263	4	282	44	30	623
-90	1,096	0.27	142	1	102	47	2	294
-91	608	0.30	143	0	19	20	3	185
-92	803	0.32	84	1	166	3	0	254
-93	306	0.18	45	2	7	0	0	54
-94	231	0.84	26	2	161	5	0	194
-95	480	0.20	43	2	33	15	3	96
-96	94	0.14	11	0	0	2	0	13
-97	315	0.26	34	2	14	25	8	53
-98	205	0.28	24	4	22	4	3	57
May-85	29,907	0.36	512	165	5,893	1,390	2,893	10,907
-86	36,854	0.42	264	426	5,446	2,601	6,715	15,452
-87	48,326	0.32	510	1,028	6,365	6,435	1,336	15,694
-88	36,212	0.43	246	861	11,174	2,895	459	15,647
-89	32,326	0.43	275	904	10,672	1,827	320	13,998
-90	21,646	0.38	183	259	5,852	1,628	316	8,238
-91	18,155	0.43	214	527	5,197	1,820	120	7,878
-92	16,747	0.50	50	218	7,396	600	40	8,304
-93	13,508	0.64	128	765	6,889	820	72	8,674
-94	14,032	0.83	59	1,888	8,964	539	221	11,671
-95	11,984	0.45	95	1,299	3,249	568	145	5,356
-96	9,564	0.59	94	345	4,991	185	52	5,667

-97	8,906	0.76	187	319	5,697	403	169	6,775
-98	2,689	0.48	86	1,325	3,199	1,578	463	6,651
Jun-85	85,148	0.30	1,151	740	8,081	8,000	7,344	25,417
-86	87,786	0.31	714	921	8,173	9,363	8,035	27,206
-87	98,871	0.33	823	3,579	8,172	9,750	10,026	32,350
-88	108,080	0.31	472	6,010	12,463	9,161	5,748	33,854
-89	95,019	0.32	456	8,483	9,654	10,777	1,451	30,821
-90	64,003	0.30	276	5,169	7,920	4,931	921	19,217
-91	59,237	0.34	349	6,340	3,734	7,987	1,749	20,159
-92	46,176	0.35	141	5,166	7,283	3,048	521	16,159
-93	42,611	0.43	335	6,014	7,247	4,021	666	18,283
-94	43,443	0.43	81	7,905	6,730	3,142	707	18,565
-95	44,681	0.40	96	7,421	3,774	5,362	1,012	17,665
-96	36,754	0.31	51	1,049	7,618	2,358	319	11,395
-97	37,920	0.60	248	4,769	13,339	2,702	1,800	22,858
-98	49,059	0.43	238	5,079	4,452	5,735	5,519	21,023
Jul-85	127,833	0.31	2,134	941	4,455	9,898	22,838	40,281
-86	142,957	0.29	1,855	1,268	4,637	8,429	25,801	41,987
-87	153,669	0.35	2,427	2,980	2,887	8,478	37,380	54,152
-88	177,029	0.25	2,457	3,541	3,054	16,878	18,315	44,245
-89	134,403	0.30	1,064	8,961	4,280	13,018	13,032	40,355
-90	104,814	0.27	1,498	5,182	2,794	9,802	8,955	28,231
-91	93,287	0.33	871	6,822	1,834	8,933	12,544	31,004
-92	75,379	0.30	1,223	3,907	3,468	6,927	7,440	22,965
-93	68,884	0.37	1,229	8,603	2,656	5,151	7,778	25,417
-94	72,065	0.39	1,370	10,012	4,648	4,382	7,593	28,005
-95	71,313	0.53	1,459	9,768	4,694	5,165	16,417	37,503
-96	68,146	0.39	396	3,798	9,868	2,996	9,660	26,718
-97	75,359	0.44	760	7,573	8,514	5,300	10,956	33,103
-98	74,671	0.31	558	3,076	1,110	7,731	10,886	23,361
Aug-85	93,707	0.31	1,455	644	1,692	5,978	18,918	28,740
-86	117,258	0.28	1,169	1,222	1,511	7,322	21,946	33,170
-87	115,960	0.30	1,237	5,678	1,009	7,230	19,813	34,967
-88	118,556	0.26	1,807	7,772	1,350	7,949	12,455	31,333
-89	104,657	0.30	2,855	1,577	2,511	7,673	16,995	31,611
-90	89,526	0.28	1,839	1,620	1,154	9,634	10,475	24,722
-91	76,203	0.32	1,898	1,362	663	7,036	13,422	24,381
-92	66,544	0.27	1,750	2,970	744	5,872	6,340	17,676
-93	67,215	0.35	2,243	7,548	749	6,450	6,837	23,827
-94	63,533	0.29	1,357	3,451	683	5,583	7,413	18,487
-95	55,097	0.35	827	3,011	636	6,169	8,911	19,554
-96	69,022	0.45	1,151	4,780	3,538	3,445	18,483	31,397
-97	68,271	0.34	957	1,627	4,085	6,711	9,966	23,346
-98	66,274	0.36	383	6,063	989	7,174	9,481	24,090
Sep-85	28,041	0.24	263	282	396	1,095	4,597	6,646
-86	26,575	0.21	168	153	619	100	4,414	5,454
-87	39,226	0.28	421	2,072	493	801	7,263	11,050
-88	37,900	0.18	659	1,688	690	571	3,379	6,987
-89	32,118	0.21	792	996	539	665	3,756	6,748
-90	25,849	0.18	439	535	349	783	2,522	4,628
-91	21,455	0.22	1,199	266	235	89	2,828	4,617
-92	17,673	0.29	1,326	1,459	124	267	1,933	5,109
-93	19,327	0.26	977	1,861	127	807	1,213	4,985
-94	18,235	0.25	418	1,297	77	560	2,203	4,555
-95	17,582	0.24	191	1,535	96	969	1,420	4,211
-96	21,863	0.46	407	2,887	966	879	4,871	10,010
-97	24,117	0.30	392	353	876	2,060	3,575	7,256
-98	28,866	0.32	351	2,745	796	2,010	3,322	9,224
Oct-85	566	0.48	8	14	9	28	212	271
-86	1,700	0.22	5	11	7	5	352	380
-87	2,166	0.42	18	296	9	2	585	910
-88	4,396	0.24	80	618	24	3	344	1,069
-89	3,400	0.21	45	375	11	12	277	720
-90	1,821	0.20	46	171	14	4	131	366
-91	1,469	0.16	85	61	4	8	84	242
-92	1,932	0.31	159	240	10	1	182	592
-93	1,347	0.17	78	98	1	0	52	229
-94	1,574	0.26	67	86	5	1	255	414
-95	1,882	0.27	19	29	10	84	365	507
-96	2,452	0.44	94	58	44	107	788	1,091
-97	3,156	0.35	155	123	147	102	572	1,099
-98	1,862	0.24	43	60	25	53	261	442

TABLE 13
Algoma Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	29,998	0.36	57	2,746	155	2,272	5,690	10,920

TABLE 14
Baileys Harbor Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	4,581	0.30	7	488	1	446	452	1,394

TABLE 15
Ellison Bay Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	1,080	0.25	7	11	0	0	250	268

TABLE 16
Ephraim/Fish Creek Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	-	-	-	-	-	-	-	-

TABLE 17
Gills Rock Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	8,530	0.21	120	124	8	21	1,476	1,749

TABLE 18
Green Bay Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	-	-	-	-	-	-	-	-

TABLE 19
Kenosha Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	23,231	0.47	280	1,753	3,095	3,856	1,897	10,881

TABLE 20
Kewaunee Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	12,959	0.34	9	1,975	120	1,148	1,152	4,404

TABLE 21
Manitowoc Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	5,764	0.35	19	1,064	55	515	368	2,021

TABLE 22
Marinette-Menominee Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	-	-	-	-	-	-	-	-

TABLE 23
Milwaukee Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	15,370	0.33	290	1,154	996	1,215	1,428	5,083

TABLE 24
Port Washington Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	40,632	0.38	307	2,338	2,021	2,756	7,818	15,240

TABLE 25
Racine Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	18,789	0.52	96	1,283	1,945	5,743	749	9,816

TABLE 26
Rowley's Bay Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	158	0.22	0	7	0	5	22	34

TABLE 27
Sheboygan Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	33,242	0.23	240	2,449	863	1,894	2,223	7,669

TABLE 28
Sister Bay Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	-	-	-	-	-	-	-	-

TABLE 29
Sturgeon Bay Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	11,880	0.35	46	935	72	617	2,514	4,184

TABLE 30
Two Rivers Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	10,052	0.33	33	970	126	1,653	570	3,352

TABLE 31
Washington Island Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	1,780	0.22	14	23	0	3	354	394

TABLE 32
Winthrop Harbor Charter Fishery Effort,
Catch Rate, and Catch: 1998

Year	Angler Hours	Fish per Angler Hour	Brown Trout	Rainbow Trout	Coho Salmon	Lake Trout	Chinook Salmon	Total
1998	16,768	0.44	158	1,032	1,136	2,141	2,972	7,439

TABLE 33
Sea Lamprey incidence (lampreys per 100 fish) for chinook salmon and lake
trout harvested by Wisconsin's charter boat fishery in Lake Michigan, 1992-1998.

Year	Chinook salmon	Lake trout
1992	0.09	0.35
1993	0.05	0.26
1994	0.05	0.18
1995	0.10	0.20
1996	0.04	0.17
1997	0.07	0.36
1998	0.16	0.54

Figure 4. Harvest of salmonids by port for Wisconsin's 1998 charter season

